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AN INVESTIGATION OF THE USE OF THE FINAL
WRITTEN EXAMINATION IN SECONDARY
EDUCATION

BY

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B. A. University of Illinois 1912

THESIS

Submitted in Partial Fulfillment of the Requirements for the
Degree of

MASTER OF ARTS

IN EDUCATION


IN

THE GRADUATE SCHOOL

OF THE

UNIVERSITY OF ILLINOIS

1916



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I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY SUPER-
VISION BY John Breen Phillips

ENTITLED An Investigation of the Use of the Final Written
Examination in Secondary Education

BE ACCEPTED AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE
DEGREE OF Master of Arts in Education

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*Required for doctor's degree but not for master's.

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AN INVESTIGATION OF THE USE OF THE FINAL WRITTEN EXAMINATION IN SECONDARY EDUCATION

Chapter I INTRODUCTION

Among the numerous educational problems that are presenting themselves today not one needs more careful consideration than the final examination question. On every side dissatisfaction with the results of written examinations is expressed. Although many suggestions for improvement have been offered from time to time, very little has been done really to improve the situation.

The problem set in this study has been to make a careful investigation of the variation of practice in the secondary schools in America and Europe together with a careful analysis of the actual examination questions with the view to determining in the first place the importance of the final examination, and in the second place to formulating and testing a tentative scale for supervision of these written examinations.

At the outset, however, a brief historical sketch of the evolution of the examination as an educational device will be given.

Chapter II

Historical Evolution of the Examination as an Educational Device

As China has the oldest organized system of education it is true that this country has had more experience with examinations than any other. The Great Shun held examinations for the selection of officials as early as 2000 B.C. A system of competitive examinations was introduced during the second century B.C. for the selection of individuals for all civil offices, and by this means the important positions in the state were filled with men of literary attainments. Naturally this innovation was followed by a change in the educational system. Private schools sprung up with the object of preparing pupils for these state examinations.

The Board of Examiners with the Han-lin or Academicians of Peking as the officials has been an external influence that has dictated to the schools of China for many centuries. But a thorough change is now taking place. On account of an imperial decree issued in 1905 the old system is being replaced by one that accords more closely with European and American ideals.

We find that the ancient nations of the western world did not make use of such a system as that of China. For instance, in Egypt the professional man obtained his position by passing through a successful apprenticeship and the civil offices were filled by direct descendancy and by appointment of those who possessed special ability.

The professional requirements in Greece were similar to



those in Egypt, while the civil positions were filled by those of special talent. In the regular process of educating the Spartan youth the pupil was questioned by the elders. Also he was frequently given the "whipping examination" as a test of his endurance of physical pain. Athens is the place, however, where the oral examination, either in the form of question and answer or of disputation was extensively used as the method of instruction. Socrates is spoken of as the first great examiner. Yet, it must be kept in mind that his noted dialectic method is one of instruction rather than one of examination.

It is during the reign of Emperor Antoninus that an examination was instituted for the selection of teachers in Rome. This practice was extended to other professions. The aim of such a test was to determine whether or not a person was fitted for his chosen work. But education continued for several centuries without any apparent need for the new device.

The different types of examinations given in the mediaeval universities were disputation, determination, and defense of a thesis, and the delivery of a public lecture. As the teachers slowly realized the value of the examination as a factor in education they introduced the practice into the schools. Gradually the examination changed from a test of fitness to an attempt to see whether the pupil knows what he is expected to know. This made written work possible. In 1702 Bentley at Trinity College, Cambridge, held the first written examination¹. Although this was the first written one in Europe, the earliest one in the modern sense was the mathematical Tripos founded in 1747. St. Johns

¹ E. Moore, What is Education, Chap. X.

College, Cambridge, was the next to introduce examinations into the school work, but Oxford soon followed the example. And in 1802 an actual examination was held by Oxford for the B.A. degree¹.

This method of testing educational progress in one form or another soon extended to all schools and grades. And it is in connection with the work of the school that examinations have been found most useful. They are used either as a part of the regular class work in the form of reviews, or at certain periods as a means of determining the pupils' ability to pursue advanced work. In either case the teacher who has charge of the pupils usually does the examining, but frequently the principal or superintendent holds the examination, in which case the teacher is tested as well as the pupils.

However, many external agents have from time to time examined the school work for various purposes. For instance, in 1861 the elementary education of England was submitted to the influence of governmental examinations in order to get a basis for distribution of grants. Another example of the same practice is the examination given by states or other authorities such as universities, professional schools, etc., either as a test of the ability of pupils who after finishing the secondary school expect to enter the higher schools, or simply as a test of the knowledge already gained.

The first form, termed the college-entrance examination, is practiced in England more than in any other country. In fact there is a decided movement in the United States toward substituting a system of accrediting for entrance examinations, an innova-

¹ Monroe, A Cyclopedia of Education, s.English System of School Examinations.

tion originating at the University of Michigan in 1871. The second type, or school-leaving-examination is practiced in Germany and France.

There is another kind, namely the competitive examination, that deserves at least a brief discussion. The apprenticeship method of preparing for a profession as practiced in Egypt and Greece prevailed until the nineteenth century. But at this time there was a second development of examinations which had for its aim the testing of candidates who wished to enter the professions or government service. The most common use of this type of examination is in connection with civil service. This system of appointment was introduced for the first time in England as a means of selecting competent men for civil service in India (1855)¹. Open competition for home departments, however, was not introduced until 1870. The Civil Service Commissioners endeavor to avoid affecting the educational system in any way through the examinations. But the criticism is often made that pupils frequently drop out of the regular schools and enter special schools that prepare candidates for the government examinations.

The civil service system of the United States is gradually recovering from the ill effects of the "spoils system". The National Civil Service Law of 1883 offered some measure of reform. Yet about 40 per cent of civil service appointments are subject to the old control. There is no institutional preparation for entrance into civil service. This development will probably come, however, when the tenure of office is more definite and safe, for there are already signs of it as shown by the preparation

¹ Monroe, A Cyclopedia of Education. s.Edu.for Public Service.

for the consular service. Since 1906 there has been a more definite standard set for this service. George Washington University, Columbia, Yale, and many western universities, have responded to the demands and offer special courses.

The German system resembles that of England in that it is dependent on competition but the standard of preparatory training is much higher. In Prussia, for instance, all candidates for the lower offices of civil service must have passed the examination given at the end of the sixth year of the secondary education and also a state examination. Moreover, they are given a course of special training during a probation period. Aspirants for the higher positions must as a rule have studied for at least three years in a university or technical school, must pass an academic examination in their respective fields, and finally a state examination¹.

In France there is keen competition for the different civil service positions. Most of the appointments are filled by means of competitive examinations; however, there are a few which have special prerequisites as we find in Germany. Also the special training is given after appointment. But the French government supports very few special schools - mainly technical - besides the military and naval schools².

¹ Monroe, A Cyclopedia of Education. s.Edu.for Public Service.

² Ibid.

Chapter III

PRESENT PRACTICE IN FOREIGN SECONDARY SCHOOLS

A. The Examination System of Germany

The higher schools of Germany aim to give an allgemeine Bildung, but this liberal education is considered also the first stage in a practical preparation for life. And the system of examinations and privileges brings out this fact in a striking manner. In the first place the aim of the examination is to test the ability to use knowledge rather than the extent of information. The inclusive nature of the examination is designed to determine what the individual is rather than what he has by way of information and skill in displaying it. The importance of this examination from the practical point of view is clear when one considers the fact that with the completion of the successive grades in the higher schools certain privileges are granted which govern the future of the individual. In a sense each grade is a definite step in the preparation for a professional or business life.

There are two kinds of examinations in the higher schools: the public and the private. The first of these two types, given at the end of semesters, is for the benefit of the parents and others who wish to gain information concerning the work of the school. As a matter of fact such occasions are regarded as days of "open house" for the school. Laboratory note-

books, drawings, etc. are on exhibit. After each teacher questions his pupils for a brief period, the whole school takes part in a general program of music, readings, and debates. This type of examination, however, is falling into disrepute and has already been abolished in some Gymnasien.

The second type includes all the tests that occur as a part of the class room routine. All of these are conducted by the teachers and are regulated by the authorities of the respective schools with the exception of the intermediate examination at the end of the sixth school year, and the "leaving" examination at the end of the ninth year.

The leaving examination, Maturitätsprüfung,["] was made a requirement for admission to the university and the learned professions as early as 1834. The object of this requirement was to protect the welfare of the state. As a further safeguard a special examination, the Staatsexamen, is given after four or five years of professional study. The former endeavors to discover signs of promise while the latter attempts to reveal strength or real worth in the individual. In order to establish a satisfactory standard it has been found necessary, therefore, to exercise much care in administering the leaving examinations, and, since the state helps to support these schools and must in turn depend for support upon their product, it is reasonable that the state should be represented in the examination in order to offset too much local influence. So we find the examining board a combination of local government and state control. The committee con-

sists of one person appointed by the provincial school board, who acts as chairman, the director of the Gymnasium, and the teachers of Oberprima. In case of city and endowed schools the patrons may select one member of this board.

There is a definite procedure in respect to admission to the examination. The pupil must make a written application at least three months before the end of the semester. These applications with a complete scholastic record and any other information that bears on the matter are placed before the committee. This body may recommend for admission all those unanimously agreed upon as satisfactory in scholarship and morals. In any case, the data concerning every applicant are sent to the provincial school board, which has the final decision as to those who may take the examination.

The final examination is partly oral and partly written. According to the regulations adopted in 1901 the written work required of a pupil from any secondary school includes a German essay and four problems in mathematics - a problem from each of the following subjects: algebra, plane geometry, solid geometry, and trigonometry. In addition to this a pupil from the Gymnasium must make a translation from German into Latin and from Greek into German; the pupil from a Realgymnasium must make a translation from Latin into German and from German into French or English, must solve a problem in physics, and must write an essay in either French or English; and one from an Oberrealschule

must make a translation from the German into English, must solve one problem in physics or chemistry, and write an essay in either French or English. The oral examination includes for all the Christian religion, history, and mathematics. Those from the Gymnasium are questioned also in Latin, Greek, and either French or English, while those from the Realgymnasium are quizzed in Latin, French, English, and physics or chemistry, and those from the Oberrealschule, in French, English, physics, and chemistry.

The written work covers the subject-matter given in the Oberprima. The teachers submit a list of three questions in their respective subjects and the provincial school inspector selects from these the ones he wishes to give, or in case they do not come up to standard he may replace them entirely. According to Russell^x the questions test the ability to use knowledge as extensively as possible. For instance, the passages for translation are on a level with those studied, but they must be absolutely new material.

After the papers have been graded by the regular teachers and after the committee has passed judgment upon the candidates, a detailed report including the examination papers, etc., is sent to the provincial school board. An oral examination, held under the supervision of the school inspector, is given to those who failed to make a good showing in the written tests. The final standing of the pupil is determined by vote of the com-

^x Russell, German Higher Schools, pp 175-193.

mittee after a careful consideration of his school record and his standing on the written and oral examinations.

In respect to the nature and procedure of the Reifeprüfung, which is the leaving examination in the six-year schools, it may be said that these features are quite similar to those of the examination just outlined. Moreover, it has been found advisable so to alter the nine-year course as to give a fairly balanced education to those who attend merely long enough to secure the special military privilege. As a result the Abschlussprüfung has been introduced in order to establish a definite standard at this level.

In conclusion a few of the good and bad features of the system may be referred to. As far as the types and administration of the examinations are concerned there could scarcely be a better system developed from either the theoretical or the practical point of view. It stands out in bold contrast with that practiced in England and many places in America. It is not an external force that dictates to the teacher, but rather a device by means of which a standard of school performance is established with due consideration of the teacher's efforts and the individuality of the pupil. The German teacher may develop the course and solve his problems in his own way, while the English teacher is obliged to keep in mind the college-entrance examinations. Another merit of the system is that the leaving examination serves also as the entrance examination for universities

and professional schools. And finally the privilege of one-year military service granted to those who pass the Abschlussprüfung or its equivalent is a commendable incentive.

On the other hand, since all positions of honor and trust in the state are open only to those who successfully pass through the higher schools, we may look upon the whole system as a repressive agency. Such a system is undemocratic and tends to add to the power of bureaucracy.¹

¹ J. E. Russell, German Higher Schools, p 193.

B. The Examination System of France

State inspection and uniformity of program make external examinations unnecessary in the lower classes of the French secondary schools. Of course there are examinations, which are a factor in promotion, but a pupil who does good work is excused from them. It is interesting to note that these promotional examinations are not given in rapid succession at the end of the term as they are in America. In addition to the regular class work a composition is usually required in each subject once a term.

But the real goal of the pupils of the upper classes is the baccalaureate degree. The examination for this degree is conducted in each of the fifteen university districts and at Alger in Africa by a board appointed by the Minister of Public Instruction. The committee is composed of representatives of the Faculty of Letters and Science of the district university, together with an equal number of secondary teachers, either in active service or on the retired list. There are two sessions each year, held in the different university districts of the country. The examination is divided into two parts. The first part comes at the end of the first "form" (or the last year except one of the secondary school) and covers the work given in the first two years of the second cycle. The second part comes at the end of the last year of the second cycle and covers the work of the last year only.

Although there are four courses leading up to the secondary-school degree there is no further distinction made between them, for all serve the double function of a diploma of graduation and an entrance permit to the universities and many of the professional schools. In the First Part the requirements vary with the sections. A candidate from either of the four courses is required to write a French essay. There is a Latin passage to be translated into French by those from the three sections offering Latin. A problem is given in mathematics and physics for the science sections. A composition is required in a foreign language at the choice of those from the modern language section. And finally those of the Latin-Greek section must translate a Greek passage into French. After passing the written section the candidate must face an oral examination in which he is questioned extensively in the different subjects of his division and required to make at least two translations.

The Second Part is governed by two courses only. The written work in the "philosophy form"¹ consists of a French essay and a paper in natural history and physics. In the mathematical section there is a **paper** in each of the following subjects: mathematics, physics, and philosophy. There is also an oral ordeal in each of these that resembles those of the First Form.

The French essay is considered the most important part of the first examination. As the French have high regard for

¹Note. The last year of the secondary school is called "Philosophy form."

their language great emphasis is placed upon the rhetorical aspect. The examination not only tests the ability to use knowledge but also the method of using it. The latter point is the main distinction between the French and German examinations. The criticism may be made that such a practice tends to emphasize words unduly, but the philosophical form is the redeeming feature. In the last year the pupil is well grounded in ideas and ideals. In conclusion it may be said, then, that "culture fortified by clear thinking would appear to be the aim of the two parts of the baccalaureate." ¹

¹C. Brereton, Studies in Foreign Education, p 54.

C. The English System of Secondary School Examinations

In order to understand the present examination policy of the secondary schools in England, it is necessary first to consider the historical development of the system. As early as 1853 examinations in secondary subjects were held by the College of Preceptors. Oxford and Cambridge instituted systems of examinations for pupils of secondary schools in 1858,¹ but the first important step came in 1870. The possibility of a government examination of secondary schools as a result of the Endowed-Schools Act of 1869 prompted the head masters at a conference in 1870 to urge the universities to shoulder the responsibility of giving leaving examinations which would also serve as entrance examinations to the universities. This agitation resulted in the formation of the Oxford and Cambridge Schools Examination Board in 1873. Representatives from these schools held examinations at certain centers. This practice soon extended to all the leading universities. However, these examinations as a rule did not serve as the entrance examinations for the military schools or for the civil service. As a result of the special examinations for the various departments of civil service numerous preparatory institutions were established.

This multiplicity of examinations reached its high-water mark about fifteen or twenty years ago. The schools were

¹Monroe, A Cyclopedic of Education, s. English System of School Examinations.

were controlled absolutely by external examinations. The upper classes suffered most, for the pupils really prepared for the special-entrance requirements of the schools which they expected to attend. The class instruction degenerated into a monotonous question-and-answer type, and there were all the other objectionable features that result from such an influence.

The chaotic situation just described moved the school authorities to the consideration of measures of reform. In 1904 the Consultative Committee of the Board of Education proposed a scheme for the establishment of a representative central board whose business it should be to standardize and control the examinations and to secure a basis of equating certificates. As a result of this, joint inspection by the universities and the government is slowly increasing in extent and importance. The universities are cooperating in an effort to reduce the number of entrance and preliminary examinations, and the professions are making more extensive use of the system of equivalences. Although promotion in a course has been determined by the results of an internal examination, more weight is being given to the pupil's class-room record and to the teacher's judgment. The examinations, however, are in need of improvement. The present type attempts to determine the pupil's extent of information.¹ Contrary to the French idea little attention is given to the style of expression. Furthermore, the ability to use knowledge

¹C. Brereton, *Studies in Foreign Education*, p 59.

does not receive the emphasis in the English examination that it does in those of France and Germany.

If the present agitation continues the time is not far distant when a new system of examinations will be adopted. The recommendations of the committee for the investigation of examinations have met the general approval of the head masters. But the authorities "higher up" have not taken definite action as yet. The main features of the report are that there should be established two grades of examinations, one at 16 and the other at 18; that these be accepted by universities and professional schools as entrance examinations; that a committee appointed by the Board of Education act in conjunction with the Teachers Registration Council on all questions of standard; that the examining board consist partly of teachers in active service; and finally that the schools be permitted within certain limits to give their own questions.

Chapter IV

The Examination in the High Schools of the United States

The present status of the examination in our secondary schools has been studied from two angles of approach. In the first place, the actual variations of practice have been ascertained as far as possible. And, secondly, the attitudes of practical educators and educational theorists have been considered.

The first part of this study is based upon data obtained by means of questionnaires sent to about 400 superintendents and principals. Every state is represented and of the 209 replies, 110 are from cities with more than 5000 population, while the others are from places under 5000 in population.

By consulting the data tabulated at the end of this discussion it will be found that 176 of the 209 schools have final written examinations. In most cases these are held in the recitation rooms. The time allotment for the written work in a subject varies, but the usual time ranges from one and one half to three hours, with two hours as the most frequent duration. As a rule the final-examination-grade counts one third towards the final grade. However, many schools value it at one fourth.

It is rather surprising to note that about two

schools out of three practice exemption from "finals" on one basis or another. Many of these exempt on the basis of grade only. But most of them consider deportment as well as the class grade. A few, however, have a few special requirements such as papers and oral reports. On the other hand, the insertions in respect to the consideration of absence and tardiness are too indefinite to warrant a definite conclusion, but it seems that many of the schools give these points weight under deportment, while others have no set ruling concerning the matter except that the work be made up.

Unfortunately there are many schools where there is no supervision of the questions. There is no excuse for such neglect except in schools where the state furnishes the questions. At least the questions of many teachers should be examined. Where questions are supervised this important task is usually done one week before the day of examination. This work is usually done by the superintendent in the small school; but it is commonly the duty of the principal in the large ones. The State boards of New York and Minnesota and the High School Inspector of Louisiana furnish the questions for the examinations in these states; but in the other states the questions are made out by the teachers, with the exception of a few cases where the principal and teacher make them or the principal alone. There is marked agreement among those who examine the questions as to the prevailing faults. They are convinced that the examination questions are frequently too long, too difficult and vague, and that too much emphasis

is placed on rote memory. They think too little attention is given in the written work to originality, reasoning, judgment, observation, and logical memory.

Before leaving the subject of present practice among the schools that hold the regular finals of the old type, I wish to mention a few other facts. A mid-term examination, which is usually conducted as the regular "finals" are, is a rather common practice. Most of the schools also give a final at the end of each term in a whole year subject. Only a very few are in favor of senior exemption either for the year or for the second semester.

The variation of practice in the 33 remaining schools which do not give examinations of the old type, if any at all, is a very interesting topic, for the tendency revealed is one that deserves careful consideration. In most of these schools the final grade is based on daily work and written tests which are given as a part of the regular class work. As one would expect there is little uniformity in requirements as to the number of these tests, for a few have them every six weeks, others once a month, and many when the teacher desires. In case of a few of these schools, however, the tests come at stated times and are valued as regular "finals." An interesting variation of this practice is the system employed at Springfield, Illinois. We find here that the last two weeks of the semester are set aside for review. The marks made on all of the tests, written or oral, given during this time are recorded as the final examination grade.

On the other hand, there are schools where promotion depends absolutely upon the excellence of the daily work. A good example of this is the system used in Lewiston, Idaho. Here promotion is based on daily work. In addition to grades in the regular subjects, pupils are required to have a satisfactory standing in attitude, attention, industry, improvement and initiative. When a pupil shows evident signs of failure he is reported to the superintendent and parents in order that every effort may be made to avoid possible failure. At the end of the semester there is a thorough review of the work.

The interpretation of these facts brings us to the second phase of the subject. What are the attitudes of practical educators and educational theorists toward the whole matter of final examinations? It is evident from the preceding discussion that the extreme stress once laid upon the value of examinations in the high school is gradually relaxing; indeed, one frequently hears it said that examinations are useless if not a positive evil. However, there are those who say that they are indispensable in all high-school subjects as a safeguard for thoroughness and exactness. Then again, there are those who take the middle ground; that is, they realize the value of examinations but maintain that their employment should be limited. It is necessary, however, to discuss more fully each of these groups.

Those who maintain that examinations are useless

point out the following disadvantages.¹ Examinations are untrustworthy, for they are often a bar to future work the pupil wishes to do. This matter has been extensively studied by W. E. Chancellor, who concludes that written tests give the visualist and hand-motor pupil an advantage over the auditory type with vocal-motor tendencies and thereby very often exclude capable individuals from further advancement. Furthermore, they are unnecessary, for the teacher is in a position to make a satisfactory estimate of the pupil's worth.

Examinations are unreliable for various reasons. The chief of these are the test may come at a time when the child is below par; nervous strain and overfatigue due to worry and cramming may handicap some; the test itself produces unnatural and disorderly thinking as Lobsien's experiment shows;² and finally there is no uniform system or basis of grading.³

[Examinations are artificial stimuli] which provide the wrong kind of motives for study and do not secure the proper type of interest in the school work.⁴

They reduce information subjects to features of an examination system. For instance, the sciences are reduced to the question and answer method.⁵

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1. W. E. Chancellor, Written Examinations: The Scientific View, Journal of Education, Vol. 81, pp. 451-456.
 2. Monroe, A Cyclopedia of Education, S. Hygiene of Examinations.
 3. E. C. Moore, What is Education, Chapter X.
 4. E. H. Nichols, The Influence of Examinations, Edu. Rev., May, 1900.
 5. E. C. Moore, What is Education, Chapter X.

Bad habits of study are fostered by the preparation for an examination. The pupil stores up a vast number of details with the result that the proper scheme of values is lost sight of.¹

They frequently cause serious physical and mental disorders.²

The pressure of examinations is likely to fall upon those who least need the stimulus.³

The most conservative individual will admit that most of these are valid criticisms. But after all can the schools do without examinations?

There is a group of people who maintain that by no means should the examination be discarded. They believe in a uniform application of the written test to all the high-school subjects. A rigid examination system serves as the back bone of any educational system. Only by such a check will American education be saved from following the line of least resistance. There are several direct advantages which they point out:

(a) In the first place they argue that it is a more reliable gauge of the pupils' ability than any other which can be devised.⁴

1. W. E. Chancellor, Written Examinations: The Scientific View, Journal of Education., Vol. 81, pp. 451-456.

2. Ibid.

3. Monroe, A Cyclopedia of Education, S. Hygiene of Examinations.

4. E. C. Moore, What is Education, Chapter X.

(b) It functions as a safeguard for thoroughness and exactness.¹

(c) Poorest and best teachers alike need a standard towards which to work.²

(d) The pupil must be given an opportunity to show what he can do in an ordeal.³

(e) It is indispensable as an organizing agency of knowledge. In reference to this point, Bagley says, "The period of intense application preceding the examination represents the burning-point of attention. It is a strain, to be sure, but a strain that pays."⁴

If a conclusion may be based upon the data bearing upon this point, one may say that this group which considers the written examination a necessary and adequate test in all subjects of the high school is comparatively small. Of the 209 returns from practical educators only 13[✓] expressed satisfaction with the present arrangement. In this connection it is interesting to note that all of these with one exception are from eastern and southern states.

Third in order come the compromisers, or those who wish to follow a middle course. Although they do not wish to give up the examination, they are, however, thoroughly convinced that its use should be limited. The written

1. DuHon, School Management, p. 175.

2. E. C. Moore, What is Education, Chapter X.

3. An editorial on "The Benefits of Cramming" in Independent, Vol. 62, p. 746.

4. W. C. Bagley, The Educative Process, p. 333.[✓]



examination is valuable and a necessary part of education in case it is administered properly. But as frequently is the case it has a very unwholesome effect upon the school. Moreover, they do not believe the written examination is an adequate test in all subjects. For instance, in English or the languages the "final" should be partly oral and partly written.¹ Only in an oral examination is it possible to get a satisfactory estimate of the pupil's interpretative ability, his active power, or his aesthetic tastes.² France and Germany find it useful to supplement the written work with an oral examination. Why not extend the practice to the schools of this country?

Nor do they see the need of a final written examination in such subjects as manual training, domestic science, etc. Some special construction or problem should be substituted for the final.

In light of the fact that there seems to be a fairly general consensus of opinion that all is not well with the ordinary final examination of today, the effects and results being unsatisfactory, probably the time is here when realizable reforms should be established. For example, in order to do away with many of the evils pointed out by the liberal group, it has been suggested that an entirely new point of view be taken in reference to "finals."³

1. Consult data at the end of this chapter.

2. W. H. Payne, *Education of Teachers*, p. 187. ✓

3. J. P. Conover, *Personality in Education*, p. 219.

In other words, the examination should be looked upon more as a real part in the whole course of mental training than as a test of ability to advance in education. It should be used by the teacher not as a final test of efficiency but only as an important factor in making efficiency. As previously indicated there are several practical school men who are actually following out this suggestion. Obviously this change has a very desirable effect. The cause for worry, cramming and unhygienic habits of study is largely removed.

Then again it has been suggested that the type of examination be changed.¹ Too often is the test merely an audit of facts. But before we go further let us consider a few of the aims of examinations that are given by educational theorists.

Bagley says, "The examination must be made to test, not the memory for specific and unrelated facts, but the capacity of the individual first to organize, and secondly to apply the facts and principles that constitute the subject matter of instruction."² The ordinary examination places too much emphasis upon rote memory. As a result instruction attempts to fix facts rather than stimulate thinking.

According to Du Hon, "The examination should be a test of sound judgment and common sense."³

1. E. C. Moore, What Is Education, Chapter X.

2. W. C. Bagley, Classroom Management, p. 244. ✓

3. Du Hon, School Management, p. 175 (Cited by Miss Wilkinson in an unpublished article on Examinations.)

Strayer says: "The only adequate test of school education is action. The nearer we can in our tests reproduce the conditions which will confront the child in actual life, the better." By way of illustration he says that the examination should not test for knowledge of rules of grammar but for ability to write correctly.¹

The test for both mental states and mental connections is appropriate action, says Thorndike. If you wish to know whether anyone has a certain mental state, test his ability to use it.

In other words, these statements mean that what a pupil can do rather than what he knows should be the aim. As forgetting is a normal function of the mind strictly memory tests will always give rise to unsatisfactory results. If these facts were kept in mind when examination questions are made out and the teacher endeavor to test the different powers of the pupil, surely a decided improvement would be brought about.

The statement that examinations should test the ability to use information rather than to record it naturally gives rise to the desire to know just what the actual practice is in this respect. It is hoped that the report given in the next chapter will throw a little light upon this aspect of our problem.

1. G. D. Strayer, Brief Courses in Teaching Process, p. 102.

List of Questions and Tabulation of Answers

The questionnaire consisted of the following questions:

Final examination.--Held in assembly room or in recitation rooms?.... Time allotment for the final in each subject? What part of the final grade is the examination grade?....

Bases of exemption from finals: grade....; deportment; maximum number of times absent....; tardy....; special requirements: (underscore) papers, oral reports, etc.....

Supervision of questions.--Are the questions always supervised before examination day?.... How long before?.... By whom?.... Do the teachers make out the questions?....

Prevailing faults in examination questions: (underscore) vague; too difficult; too easy; too long; emphasis on the following: rote memory, too much or too little; logical memory; too much or too little; judgment, too much or too little; reasoning, too much or too little; observation, too much or too little; originality, too much or too little.

General:-

Do you hold mid-term examinations?....Are they conducted and emphasized as in the final examination?.... Do you give a final at the end of each term in a whole year subject?....Do you think seniors should be exempt from finals?.... Only from second term finals?....Do you consider the written examination an adequate test in all subjects?.... In what subjects do you think the final test should be partly oral and partly written?....In what subjects should some substitute for final written examination be employed as the test?.....

The following data are the returns from 209 secondary schools.

Place held

Recitation room...110 Assembly room...41 Both...25

Time allotment

Two hours...44	1 hour.....9	Half day....14
Three hours...34	1½ to 2 hours..10	
1½ hours.....24	1 1/3 hours...12	Range....40 minutes
2½ hours..... 9	1¼ hours..... 3	to no limit

Value of final examination

One-third.....89	Two-fifths.....5
One-fourth.....32	Varies.....6
One-half.....20	
One-fifth..... 8	Range.....0.1 to all

Exemption

Yes.....114
No..... 57

Basis of Exemption

Grade only.....39
95% ... 5; 90 ... 21; 85 ... 6; 80 ... 4; 75 ... 1

Grade, deportment, etc.....70
90% ... 41; 85 ... 15; 80 ... 5; 87 ... 2; 88 ... 1; E ... 2;
A ... 1; B ... 1; not given ... 2

Deportment
95% ... 6; 90 ... 31; 88 ... 1 ; 80 ... 1; A ... 6; G ... 6;
E ... 1; 85 ... 2; S ... 2

Times Tardy

None..... 9	Twice..... 4
None unexcused.. 7	Three..... 2
Three unexcused. 1	Five..... 2
No rule..... 4	No limit... 2
Once..... 3	Forty..... 1

Times Absent

None..... 5	Three..... 2
No rule..... 3	Four..... 2
One..... 2	Five..... 3
Two..... 1	Five unexcused..1
	Ten.....1

Special Requirements

Papers and reports....10
Papers..... 1

Supervision of Questions

Supervised: Yes.....103
No..... 52
Usually... 6

Time before examination:	One week....46	Two days.... 3
	Two weeks...13	Three days.. 4
	Few days.... 6	Ten days.... 2
	One day..... 4	Five days... 2
		Two months.. 1

Supervised by whom:	Principal.....44
	Superintendent.....47
	Head of Department.....11
	Principal and superintendent..... 8

Maker of questions:	Teacher.....147
	Teacher in part..... 8
	Principal..... 1
	Neither..... 10

Faults with Examination Questions

No comment	43	
Vague	39	
Too difficult	41	
Too easy	15	
Too long	68	
	Too much	Too little
Rote memory.....	92	5
Logical memory.....	4	59
Judgment.....	3	77
Reasoning.....	3	75
Observation.....	0	63
Originality.....	1	86

General Questions

Mid-term examinations:	Yes.....113	No.....62
Conducted as other:	Yes..... 92	No.....20
Final at end of each semester in a year subject:	Yes.....117	No.....49
Do you favor senior exemption?	Yes..... 18	No....147✓
Second semester?	Yes..... 24	

Is written examination satisfactory
in all subjects? Yes.....13 No.....158

Subjects in which finals should be partly oral and partly written

Languages.....54	History.....16
English.....43	Mathematics..... 9
All.....33	Commercial subjects.. 3
Science.....16	Stenography..... 2
Music..... 8	Laboratory work..... 2
Domestic Science.. 6	Chemistry..... 2
Manual Training... 5	Industrial subjects.. 3

Subjects which should have a substitute for written final

Manual Training.....16	History..... 5
Vocational subjects.15	Science..... 4
Domestic Science....13	Music..... 4
Laboratory work..... 8	Stenography..... 2
Drawing..... 5	Bookkeeping..... 2
Commercial subjects. 5	All..... 5
English..... 5	Public Speaking..... 2

No finals.....33

Chapter V.

The Nature and Scope of Typical High School Examinations.

At least twice a year the supervisor of final examinations is obliged to pass judgment upon the merits of examination questions. He must decide whether or not a particular set of questions is suitable for testing the pupil's ability to put to use his knowledge along the lines of action fostered by school work. Since he has no standard or scale for reference, however, he has no safe basis for decision. With this fact in mind a careful investigation of actual questions has been made. It is hoped, therefore, that the following results and conclusions will be useful in supervising final examinations.

Scale.

In the first place it was necessary to devise a scale which would serve as a basis of classification of the different high school questions. There are certain "outcomes" such as skills, habits, attitudes, etc., that are supposed to result from taking the different high school subjects. So far as this study is concerned, however, the object has been to determine just what use is being made of the mind in the ordinary examinations. After much study and consultation it was finally decided to use as the different points of the tentative scale the seven items listed below. However, it must not be inferred from this that there are certain "faculties" of the mind that must be tested as such.

1. Observational Power - The ability to see and report things as they actually are; sense perception as supposed to be developed by the study of science subjects especially.
2. Rote Memory Power - By this is meant the retention of ideas or impressions (singly or in an order of organization predetermined for students) which may be literally reproduced as distinct and separate facts or literal sequences. It is the skill in reproducing literally (verbally) forms of speech, definitions, sentences, paragraphs of text books, etc. without attention to the meaning or at least with primary attention to literal reproduction or verbal book mastery.
3. Logical Memory Power - not mere retention of impressions. Items memorized are here linked together in such fashion that recall is a matter of conscious sequence of process accompanied by sense of the meaning of "idea-organizations" reproduced. It is the ability to recall explicitly the consecutive steps of some former exposition of a topic or to give a clear logical report of series of organizations of past impressions.
4. Emotional Discrimination - (Appreciative and interpretative power) The study of literature and the fine arts especially has presumably much to do with the development and training of the higher feelings or emotions. Emotional impressions build up special feeling attitudes which determine the individual's appreciation of the beautiful.

5. Common Sense - The ability to make a reliable decision, demonstration of good sense, evidence of "rectitude" of practical judgment.

6. Reasoning - The power to make precise, articulated, linked formulations without reference to literal reproduction of such thought processes already traversed in the class exercises of a particular school course. Capacity for syllogistic thinking and expertness in noting likeness-difference relations, cause and effect, etc.

7. Originality - The ability to meet a new situation, speculative ability, employment of the constructive imagination, evidence that the particular topics of a course enable one to transport himself mentally beyond the ordinary confines of the particular course.

Use of the Scale by the Principals of Twenty-three High Schools in Analyzing Their Complete Sets of Examination Questions.

The application of the tentative scale was carried out through cooperation with the principals and teachers of twenty-three high schools. Some of these schools furnished two sets making thirty the total number. In case of two schools the questions were analyzed in the presence of the teachers. Twelve schools sent two good and two poor examination papers of pupils in each subject. These were secured to serve as one basis for the checking of the correctness of our interpretation of the questions asked. The questions from most of these twelve schools were also marked according to the scale by the teachers. But it

was found that there was such a wide difference of rating of the same kind of question occurring in different sets that an arbitrary standard had to be established. The rest of the questions were analyzed in accordance with this standard as set forth in the illustrative list of typical questions.

The results of the analysis are given in Table I below. The relative emphases are expressed in percents. For example, 69.81 percent of the questions in Latin I come under scale item II, or Rote Memory Power.

TABLE I.

Tabulation of Data Resulting from Analyses of Examination Questions According to the Scale.

Subject	No. Quest.	No. Papers	Scale Items						
			I	II	III	IV	V	VI	VII
Latin I	299	34	.08	69.81	6.68	0	1.67	20.23	1.50
Latin II*	198	25	.25	34.84	25.50	0	2.14	33.96	2.77
Latin III	143	19	.17	25.87	31.29	0	2.09	36.36	4.18
Latin IV	119	15	1.05	29.41	26.26	1.89	5.04	32.56	3.78
Latin Total	759	93	.29	46.08	19.30	.29	2.40	28.78	2.70
German I	212	28	0	66.98	11.32	0	1.65	18.86	1.17
German II	178	25	0	49.72	18.96	.14	2.81	27.24	1.12
German III*	106	18	0	46.93	21.22	.47	3.77	23.82	2.83
German IV	68	12	0	36.39	27.94	1.83	5.51	23.89	1.48
German Total	564	83	0	54.08	17.59	.35	2.88	23.04	1.68

Subject	Scale Items								
	No. Quest.	No. Papers	I	II	III	IV	V	VI	VII
French I	74	6	0	45.60	14.86	0	1.68	34.45	3.37
Spanish I	10	2	0	40.00	22.50	0	0	37.50	0
English I*	470	48	.32	29.78	31.39	7.55	10.85	10.76	8.51
English II*	503	56	.39	27.78	31.31	8.15	10.23	15.35	5.96
English III*	505	58	.15	21.93	34.05	9.65	11.23	15.15	6.03
English IV	317	36	0	27.12	32.96	8.83	11.51	12.46	6.78
English Total	1795	198	.24	26.53	32.39	8.53	10.90	13.59	6.79
History Amer.	236	24	.85	17.58	44.91	0	9.53	25.63	1.48
History Anc.	237	23	1.79	25.21	45.88	.10	5.16	20.14	1.68
History M&M	203	22	.49	16.99	56.77	0	5.78	18.96	.98
History Eng.	135	12	.55	20.24	62.46	.24	6.11	8.70	1.66
History Greek	84	9	1.19	18.75	46.13	0	14.58	17.26	2.08
History Rom.	15	3	0	5.00	53.33	0	28.33	13.33	0
History Total	910	93	.98	19.73	50.66	.06	7.82	19.23	1.48
Civics	64	6	0	21.09	50.00	0	9.76	15.62	3.51
Arithmetic*	298	29	.67	12.75	31.71	0	1.59	52.26	0
Algebra	823	82	.12	8.01	32.65	0	3.12	55.65	.42
Plane Geom.*	479	59	.42	16.07	31.78	0	1.98	43.26	6.26
Solid Geom.*	66	8	0	23.95	32.95	0	.75	37.87	3.03
Geom. Total*	545	67	.37	17.01	31.92	0	1.83	42.61	5.87
Zoology	204	21	11.51	32.59	34.06	0	7.59	13.35	.85
Biology	32	3	7.81	20.31	46.87	0	4.68	17.18	3.12
Botany	93	9	9.94	38.17	32.52	0	6.45	11.83	1.07

Subject	No. Quest.	No. Papers	Scale Items						
			I	II	III	IV	V	VI	VII
Physiology	70	8	12.14	42.50	26.07	0	7.50	5.00	3.92
Physiography	221	22	4.07	33.82	34.61	0	4.97	21.71	.79
Gen.Science	64	6	10.15	26.56	33.20	0	9.37	18.34	2.34
Com. Geog.	17	2	0	30.88	30.88	0	11.76	20.58	5.88
Agriculture	111	12	7.65	42.79	32.88	0	9.45	6.98	.22
Physics	291	27	5.84	30.32	24.74	0	3.23	34.27	1.54
Chemistry	293	28	4.26	34.64	34.53	0	4.09	22.17	.25
Manual Tr.	163	20	14.41	34.81	23.31	0	11.34	10.27	5.82
Dom.Sci.	360	45	5.00	25.49	38.25	0	12.91	15.69	2.64
Drawing *	122	12	17.09	22.51	26.00	3.48	5.09	15.36	8.60
Music	47	5	3.06	36.73	36.22	8.16	7.65	8.16	0
Com. Law	69	7	0	26.81	30.79	0	9.78	25.00	7.60
Bookkeeping	103	17	0	20.87	30.58	0	6.79	39.32	2.42
Typewriting	19	4	10.52	47.36	15.78	0	5.26	5.26	0
Stenography	134	13	0	71.45	8.20	0	8.95	9.51	1.86

* Special Emphases: -

Latin II, .5 for arrangement; German II, .94 for speed; Neatness, punctuation, etc., in Eng. I, .85, Eng.II, .79, Eng.III, 1.73, Eng. IV, .31, or Eng. total 1.00; Arith., 1.02 speed and accuracy; Plane Geom., .21 accuracy; Solid Geom., 1.51 accuracy; Physiology, 2.85, neatness and accuracy; Drawing, 1.84 accuracy and neatness; Typewriting, 15.78, skill, speed, accuracy.

Typical Examination Questions.

The following list of examination questions has been selected from the thirty sets on the basis of frequency of occurrence. This statement, however, does not apply to those questions below the dotted line in any particular subject. These have been listed on account of the fact that they are rather uncommon. It is not supposed that the examples are ideal. However, there are many extremely good questions.

Each question has been analyzed according to the scale. The numbers following the questions refer to those items in the scale which any particular question is supposed to test. An item is valued in proportion to the part that it is of the total question except in a case like the second question in Latin where an arbitrary rating is given. In this case one half of the question is scored under reasoning while the other half is divided equally between scale points one and two.

The standards set in these examples have served as the basis of analyzing and rating all the other questions. Of course without some definite standard it would be impossible to make a consistent analysis of the questions. Even then, it has been very difficult to score many properly. Take for example the question, "Show that our government is one of checks and balances." Without a knowledge of the work done in class, one cannot be positive as to the scale items tested. If this information cannot be obtained, it is necessary to base the decision on the form of the question.

Latin I.

1. All questions asking for the conjugation, declension, synopsis and principal parts of words. 2
 2. Translate:
 - a. Nanta, potens vir, naves remisit. b. etc. 2,3,6-1/2
 3. Give construction of the underlined words in 2. 6
 4. Give the Latin for:
 1. The town had been taken by the lieutenant. 2. etc. 2,3,6-1/2
 5.
 - a. Name the modes and explain them. 2,3
 - b. Give a sentence in Latin containing all five cases and designate the case of each noun and tell why. 2,3,6
-

6. Separate into syllables and mark the accent:
Gratiae, amplius, etc. 1,2,6
7. Give all the words that seem to be derived from the following words: mitto, possum, etc. 2,5,6
8. Write three Latin sentences about the examination. 6,7
9. In what ways has the study of Latin as pursued in our regular class work helped you? 5,6,7

Questions from other courses in Latin.

1. Translation of material previously covered in class. 2,3,6
2. Scan lines 81-84 in Book I of Aeneid. 1,2,6
3. Why has the Aeneid lived? Compare it with other works of similar rank. 6
4. Sight translation of new material. 6,7
5.
 - a. What qualities were considered essential to an orator in Cicero's time? 2,3
 - b. Into what parts was a typical oration divided? 2,3

English.

1. Quote twenty-five lines from Julius Caesar. 2
 2. Write a theme upon the beliefs, manners and customs, etc. of rural England in the time which the story of Silas Marner portrays. 3,6
 3. What effect did the successive murders in Macbeth have upon you? Tell me of four passages in the Sketch Book that you like because of their beauty and discuss their influence upon you. 4
 4. Describe some local character or object. 1,2,3
 5. What is your candid opinion of the Sketch Book? 4,5,6
 6. Give two rules for the use of the apostrophe. Supply apostrophes where needed in the following sentences.
1. Lets play soldiers and Ill be captain. 2. _____ 2,5,6
-
7. Criticise the following and give your reason for criticism.
1. I had to admit I was kind of tired. 2. _____ 5,6
 8. Name six advantages you have realized from the study of English during this semester. 6,7
 9. Is there any part of The Lady of the Lake you would change? Why? 4,6,7

American History

- I. What European conditions led to the discovery of America? 3,5,6
- II. On a map indicate regions explored by (1) Drake, (2) Hudson, etc. 1,2
- III. Who were the following men: Hamilton, etc.? 2,3
- IV. Why was the triumph of Wolfe over Montcalm a turning point in modern history? Give fully the causes of the Revolutionary war. 3,5,6
- V. What advantages did the Americans have in the Revolutionary war in both geographical and military aspects? 5,6

- VI. Discuss fully the four great constitutional compromises. 3,5,6
- VII. a. Give the substance of the Monroe Dictrine. 3
b. What were the effects of emancipation? 3,5,6
- VIII. What that our government is one of checks and balances. 5,6
- IX. a. What do you consider four of the most important events in American history? Why? 5,6
b. What has America done for the world? 5,6,7

A few questions from other courses in history.

- I. Do you think Elizabeth did the right thing when she signed Mary Stuart's death warrant? Why? Which do you think was the greatest of the English kings? Why? 4,5,6
- II. Why is it impossible to understand med. history without some knowledge of the organization of the Roman Empire? 6
- III. Compare the Spartan civilization with that of the Athenians. 6

Plane Geometry.

- 1. Define: straight angle, etc. 2
- 2. Construct the following accurately, using rule and compasses.
(a) From a point on the circumference of a circle two equal chords. (b) etc. 1,3,6
- 3. Prove: (A theorem previously studied). 3,6
- 4. What is the locus of points within an angle and equidistant from its sides? Prove it. 3,5,6
- 5. State and prove a proposition relative to the concurrency of the perpendicular bisectors of the sides of a triangle. 2,3,6
- 6. Find the lateral area, total area and volume of a regular quadrangular pyramid whose alt. is 12 in. and the side of the base 10 in. 2,3,6
- 7. The rear wheel of an auto is broken so that only part of the rim remains. How can the owner obtain the radius of the wheel? Show by figure and explain it. 6,7

Algebra I.

1. State the formula for amount in terms of principal, rate and time. Define: equation, etc. 2
2. Subtract the sum of $x + y - 8z$ and $-4x + 9y$ from the sum of $9x - 2y - z$ and $-5x + 6y - 7z$. 3
3. Simplify: $11x - (7x - [8x - (9x - 12a - 6x)])$ 3 - $3/4$, 6
4. State type and factor.
 $x^2 + 6x + 9$, $n^2 - 16$, etc. 2, 3, 5, 6
5. Solve for x: $4bx - 7a^2b = 6a^2b + 3bx$ 3, 6
6. At what time between 2 and 3 o'clock will the hands of a clock be 20 spaces apart? 3, 6 - $3/4$
7. Find a number such that if 17 times the number is diminished by the square of the number, the remainder will be 70.
 3, 6 - $3/4$

Less common questions in algebra.

1. Solve by graphing: ----- 1, 3, 6
2. Without solving determine as nearly as possible the character of the roots of $10y^2 + 39y - 14 = 0$ 5, 6
3. Solve by inspection:
 $(a) m^2 - 16n^2$ etc. 1, 2, 3, 5

Commercial arithmetic.

- I. Problems in addition and multiplication for speed. 3
- II. a. Define quantity and term.
 b. Give the distributive law of multiplication. 2
- III. Applied problems of the grocer, farmer, etc. 3, 5, 6
- IV. Abstract problems dealing with the fundamental operations only. Ex. $18.009 - .000003$ 2, 6 - $1/2$, 6
- V. Abstract problems involving some reasoning. Ex. Twice $1/2$ of a number is what percent of three times? $1/4$ of it? 3, 6

Music.

- I. When did music printing begin? Discuss some of the advantages and disadvantages of it. 2,3,6
- II. Discuss briefly the mechanism of the pipe organ. 3
- III. Identify or define: folk-song, madrigal. 2,3
- IV. Discuss the Minnesingers and Meistersingers. 3

-
- V. Listen closely to the motives played, and concerning each one tell the composer, name, and performer. 2,4,5

Zoology.

1. Describe the amoeba. Tell about its locomotion, reproduction and method of taking food. 1,2,3
2. Name five orders of insects and give an example of each. 2
3. Discuss fully the metamorphosis of the cabbage butterfly. 3
4. What is the economic value of flies? Bugs? etc. 5,6
5. Why should the apple orchard not be sprayed while the trees are in blossom? Name five insect pests. 6,2
6. Give three reasons for classifying the spider with or not with the insects. Explain the struggle for existence. 6
7. What do you regard as the most useful facts you have learned from your study of zoology? The most interesting? 5,6,7
8. Show wherein the earthworm is well adapted to its environment. 6

Chemistry.

1. Give a list of the chief metals in the potential series together with their symbols and valences. 2
2. Describe in detail what takes place when an electric current is passed through water acidulated with sulphuric acid. 3

3. What is the value of the atomic theory? How would you tell whether a solution is saturated? 6.
4. How prepare oxygen in the laboratory?
Drawing of apparatus. Equation. $3-1/2$, 1,2
5. Compute the strength of a solution of sodium hydroxide of which 30 c.c. are required to neutralize 40 c.c. of dilute hydrochloric acid of strength 0.0073 gm.per c.c. 3, 6-3/4
6. Show by equations (state nature and color of products) the action of dilute hydrochloric acid upon (a) sodium hydroxide sol. (b) silver nitrate (c) iron (d) sodium carbonate 1,2,6
7. Give three acids with formulas. Give three characteristics of acids. Give two conditions where reversible reactions in solution are complete. 2,3
8. Complete and balance using formulae thruout.
Barium chloride - sodium sulphate = etc. 3,6
9. What practical applications may be made of knowledge and training gained through the laboratory work? 5,6,7

Physiography.

- I. Explain the stages in the history of a valley. 3
- II. Define: tide, gravity, physiography, climate, etc. 2
- III. Name and locate the great wind systems of the earth. (b) Describe the climate of each belt fully. 2,3
- IV. What was the Glacial Period? Give five proofs of its existence. Of what value has it been to man? 2,3,5,6.
- V. What are the causes of the change of seasons?
What different movements has the earth? 2,3
- VI. Name five things which influence the course of isotherms.
Explain each briefly. 3,5,6
- VII. Give the history of the Great Lakes
" " " " Lake Agassiz. 3
- VIII. Reckoning from the time you began this examination, state the hour and date at (1) London, (2) Manila (120° E.Long.), (3) Denver, (4) Portland, Maine. 3,6

- IX. Describe the weather conditions of today and make a forecast for tomorrow. 1,5,6,7
- X. What is a cyclonic area? What does a weather map tell you? 3

Manual Training.

1. Name nine important parts of a plane. 2
2. Sketch an auger bit showing parts. 1,2
3. Make a working drawing of article given you and make bill of material. 1,5,6
4. What is the difference in the results between filling and staining together, and staining and filling alone? 1,6
5. Make a drawing of four joints that we have had and name each. 1,2,3
6. Give three differences between a cross-cut and a rip saw.
(b) Give two ways of finding the middle of a surface by use of the rule. 1,3
7. Make an original design which you could make and complete. 7
8. What is the first requirement for good work in the shop? 5
(b) For what use in wood-work are the following things:
Pencil, knife, gage? 5,6

Mechanical Drawing.

1. Draw, name, and give use of eight lines used so far in our work and classify according to the three divisions, fine, medium and heavy. 1,2,3,5
2. Print alphabets and vertical and slant figures used in Mechanical Drawing. 1,2
3. Show missing views of the following drawings of lines; draw in all projection lines. (Given a series of lines and unfinished figures). 1,5,7

Botany.

1. Name the parts of an embryo. How does the embryo of a Monocotyledon differ from the embryo of a Dicotyledon? 2,1,3
2. What are the factors necessary for germination? Give the effect of each factor. 2,3
3. Describe the simple and the compound leaf and the internal structure of a geranium leaf. 1,2,3
4. Discuss photosynthesis including the method of storage and distribution of food. 3
5. Name and give examples of the four great groups of plants, (b) How are plants classified? 2.
6. Discuss bacteria as to size, structure, rate and manner of reproduction, and importance to man.
(b) To what group of plants do they belong? Give the names of several bacteria, and state importance of each. 1,2,6
7. What are the green algae? Where found?
(b) Describe briefly each of those studied in the laboratory. 3,1.

Physics.

1. Sketch and fully explain the working of an air-pump. 1,3
2. Define specific heat, etc. 2
3. Tell just how you would find the specific heat of lead. 3
4. Distinguish between density and specific gravity. Explain freezing mixtures. State Boyle's Law. 3,2
5. Since carbon dioxide is heavier than air why does it not remain at the bottom of the atmosphere? (b) Compare two different fluids in characteristics. (c) Explain capillary action in the soil and its use. 6,3
6. How many pulleys would you need to raise a weight of 600 lbs. with a force of 150 lbs.? Show by diagram how you would arrange them. 3,6

7. State three ways in which heat may be transferred from one place to another and give an example of each. Explain the manufacture of ice. 2,3
 8. A box 8 m. long, 6 m. wide and four deep is filled with water, what is the total pressure on the bottom? On a side? 3,6
-
9. How would you explain Archimedes principle to a class in Physics? 3,7
 10. Classify as potential or kinetic energy: gas under pressure, wind, body of water at high level, etc. 5

General Science.

1. Name some ways in which we make use of the fact that heat expands solids. Why are concrete walks made in blocks? 5,6
2. Under what conditions will a substance burn? Why do water and dirt put out fire? 5,6
3. Make drawing of an electric bell and show how it works. 1,3
4. Make a drawing of a lift pump and explain why the water rises. 1,3
5. Name the gases which make up atmosphere. Explain how we prepared one of these gases in the laboratory. What is the value of this gas? 2,3,6
6. Explain the cause of wind. In what wind belt is each of the following located: Illinois, India, Sahara Desert and Southern California. Explain the cause of rainfall in each. 2,3,6
7. Make drawings to show how meanders develop in a river. Will a sinking coastline make good harbors? Why? 1,2,5,6
8. Define and give an example of an acid. Give four uses of carbonates. What is lime? 2,3
9. Why will a dry, clean needle float on water? What causes telephone wires to sag in hot weather? 6

Agriculture.

1. Name and classify the field crops. Name four forage and two fibre crops. 2
2. Tell how to select seed corn and give three suitable places for curing it. Give reasons for selecting these places. 3,6
3. Name six leguminous plants. Give the reasons for raising a legume. Give the steps in getting alfalfa to grow. 2,6,3
4. Tell what each of the following is, the crops injured and the remedy: White grub, loose smut, rust, Hessian fly, corn root louse. 2,3
5. How can you tell when a soil needs lime? Give at least two ways in which lime improves the soil of this region. In what form and in what amounts should it be applied? 1,2,3
6. Draw a grain of corn, name the parts and tell the use of each. 1,2,3

(b) Of what value is the score card in beginning live stock judging? 6.

Physiology.

1. Define: toxin, epiglottes, etc. 2
2. What would you do in each of the following cases? Give reasons for your course of action.
(a) You sprain your ankle. 2 - - - 5,6,7
3. What is meant by a "balanced" diet? Give reasons for it. 3,6
4. Describe the structure of striated or voluntary, muscle. 1,3
5. Discuss ten laws of hygiene, giving in each case the reason for it. 3,6
6. & 7. Trace a piece of bread from the mouth until it reaches a muscle cell, giving the changes with causes that occur in the process of digestion. 2,3
8. ~~Why is the government making such a fight on adulterated foods?~~
Is it necessary and why? 5,6
9. Describe the general make-up of the skeleton. Name the groups of bones in the axial skeleton. 3,2

10. What are the functions of the skin? 2,3

Commercial Law.

- I. Define: contracts, negotiable instruments, etc. 2
- II. What does an endorser warrant to a bona fide holder? (b) Write a collateral note. 2,3
- III. How is a partnership formed? 3 Name four kinds of partners. 2
How does the liability of a partner differ from that of a stock holder. 3,6
- IV. What are the liabilities of a principal for the acts of a special agent? 2,3

(b) Under what conditions is a principal liable for the criminal acts of his agents? 3
- V. A jeweler without authority to do so, sends a watch to B and writes, "After giving the watch ten days trial, if it is not returned, I shall consider it sold." B does not return the watch. Is the jeweler entitled to recover its value? 5

Civics.

- I. How may citizenship be acquired? How lost? What are the duties of a citizen? 3
- II. Distinguish town, township, and county forms of local government. 3,5,6
- III. Explain direct legislation by means of the initiative and referendum. 3,6

Discuss minority representation in Illinois. 3,6
- IV. Give the method of nomination and election of the President. 3
- V. What powers has the President of the United States in regard to: (a) legislation, (b) appointment, (c) removal, and (d) foreign affairs. 3
- VI. Describe the process by which a bill becomes a law. 3

- VII. Who is the representative in Congress from this district?
Name the United States senators from Illinois, and the
members of the President's cabinet. 2
-

- VIII. How are cities governed under the "Commission Form of
Government"? 3,6

- IX. Name five matters of public interest which have been before
the people of the United States this year, and discuss
one of them. 3,5,6

- X. What does the school do for you as an individual? What
for society? What for a democracy? 3,5,6,7

Drawing.

1. Make a drawing of the group placed on the table. Do not
put in values or shading. 1,3
2. State the principles of perspective used in making the
drawing in I. 2,3
3. Make a cover design for a book to contain all your drawings.
Design must include a border. 1,3,5,7
4. Show by a sketch, a pleasing and displeasing arrangement of
objects on a shelf. 3,4,5,7
5. Tell how you would go about to make a sketch of a person. 3
6. Define (1) vanishing point; (2) oblique view, etc. 2
7. Make a drawing of the vase before you, put in the high
lights, shading and shadows. 1,3

Domestic Science.

- I. Give the five food principles with uses and three examples
of each. (b) Define calorie. How many calories of food
do we need daily? 2
- II. What is the importance of fruit in the diet? (b) How can
you tell good meat? 6,1,5

- III. What is necessary to make jelly? 2
 (b) Give the general method for making jelly. 3
- IV. What is the difference between green and black tea? 1,5,6
 (b) Where is destrine found? Glucose? Glycogen? 2,3
- V. Why is wheat used in preference to other cereals for bread flour? 6
 (b) State the underlying principles of bread making. 2,3

VI. Define: warp, shoddy; etc. 2

VII. Give directions for stitching on a machine. What happens when the tension is either too tight or too loose?
 How is the size of the stitch regulated? 3,1,5,6

VIII. Make a sample placket. 1,3,5,7

Commercial Geography.

- I. Name the first five mineral products of the United States in order of their importance. Same for cereals. 2
- II. For what are the following places noted: Troy, N.Y., etc. 3
- III. In 1855 flour cost \$12 per bbl. in New York, in 1900 about \$5. Explain the cause of this fall in price. 6
- IV. Trace the development of means of communication in the United States. 3
- V. Discuss the iron and coal resources of the United States. 2,3
- VI. Contrast England, Germany and France as to size, population, resources and development. 2,3,5,6

Bookkeeping.

- I. What is meant by indorsing a note? What is bank discount? Etc. 3
- II. May 3, 1915. You have on hand a note for \$800, signed by J. C. Smith and dated Jan. 16, at four months. Have this note discounted at the bank. 3,5,6

- III. As a rule one problem of the following type is given as the final examination. Journalize the following transactions, prepare a ledger, balance and close the books by balance. 3,5,6

Typewriting.

- I. Spelling lesson. (10 words). 2
- II. Meaning of the following words. 2
- III. Draw a diagram of the keyboard. 1,2
- IV. Tell how to clean and care for the machine. 3
- V. How many spaces should be used after the following points:
(a) period at end of sentence, (b) etc. 2,5
- VI. Write five correct lines of each of the following words: ---
- VII. The following sentences are written for one minute each for speed: ----- 3 & speed.
- VIII. An article of 150 words dictated at the rate of 30 words per minute. 3 & speed & accuracy.

Shorthand.

- I. Give the rules for downward and upward hooks. Write the shorthand alphabet in the following order: constants, vowels, etc. ---- . 2
- II. Write in shorthand the following words or in some cases the following letter. ----- 2,3,6
- III. The following letter dictated at the rate of speed indicated and transcribed ----- . 2,3,& speed.
- IV. Transcribe the following shorthand sentences,----- . 2,3,6

General Comments Concerning the Questions.

The following statements are some of the general impressions gained through the analysis of the questions and interviews with teachers.

1. The papers from the same teacher often vary decidedly. Therefore, nothing may be gained by institutional comparison.

2. Some questions are vague and without value. The pupils' answers are often poor for that reason.

3. Some teachers are careless in choosing questions. Several admitted that they were really ashamed of their questions for that and other reasons.

4. The number of questions varies from one in book-keeping to twenty-two in English. There were a few sets in English that were preposterous on account of length.

5. All teachers interviewed consider the scale items valuable as a sort of guide.

A Critical Consideration of the Questions of Various Subjects.

Foreign Languages.

Generally speaking there is too much emphasis given to rote memory. For example, 95 percent of one Latin paper was devoted to this item. The papers are weak in logical memory and in originality, particularly in the German questions and the last year in Latin.

In German there is a tendency towards emphasis on interpretation rather than on translation.

There was marked agreement among the teachers interviewed as to memory. They thought at least 40 percent of the questions in first year languages should test rote memory power. They thought this should receive less attention, however, in the advanced courses, possibly not more than 15 percent.

English.

The examinations in English are about as unsatisfactory as any given. A pupil's appreciation of a piece of literature cannot be expressed properly in a written examination. However, there is an effort made in some cases to get at emotional discrimination. Undoubtedly it would be better to have at least a part of the final as an oral examination. Then again many of the composition questions are very poor, since they may be answered almost entirely as a matter of memory and a good grade may be made without ability to make independent use of what has been studied. A few schools give separate examinations -- one in English and another in English composition. But as a rule a few questions are given to each in the same list. A better idea would be to tell the pupil that his English composition would be judged in part at least, from his paper in history. This would really test his ability to use his knowledge.

History.

From the very nature of history it follows that there should be little difference between the methods of study in the various courses of history. But we find that the questions in English history, for instance, emphasize logical memory more than those of other courses do. They also are deficient in reasoning questions.

Moreover, it is evident that the questions do not give any special emphasis to those powers which, according to the Committee of Ten, the study of history should develop.

There are altogether too many questions that may be answered without giving rise to much thinking of the proper type. If the social science point of view is to be accepted, more effort should be made to require the pupil to apply his knowledge to problems of today. That would mean that more emphasis should be given to judgment and reasoning in the questions.

Mathematics.

A few papers in arithmetic and algebra give much attention to definitions and explanations. Possibly a little of this is permissible, but the proper method of approach is to test the pupil's ability to use independently his knowledge of the subject. The examination might well emphasize rote memory so far as drills in the fundamental operations are concerned, but the greater part should be devoted to reasoning.

The geometry papers do not as a rule give enough attention to observation and originality. Original exercises in solid geometry are strikingly few.

The Science Subjects.

In case of the sciences memory questions are decidedly popular. It is probably due to this practice with its natural effect upon the class-room instruction that these subjects have made such a poor showing in our schools. There is absolutely no excuse for this practice in physics and chemistry. Not the audit of facts but the application of principles should be the aim of the final in these subjects. Observation, reasoning and originality should receive more attention.

The questions in botany are very unsatisfactory in many cases. If the form of the questions was changed, at least, a little variety would be added. More attention should be given to observation and the application of the facts learned in the course. However, it may be impossible to do this without taking the pupils out of doors. The final examination may well consist in part of a field trip in which the pupils are required to identify and discuss the distinguishing features of native plants.

Manual Training.

Probably there is more emphasis on rote memory than there should be. However, there are a few good papers. There are four schools of the list where an actual laboratory exercise serves as the final examination. If the only excuse for an examination in this subject is to test a pupil's ability to design and construct something, then it follows that an actual construction may be substituted for the final. As in a few cases in domestic science a part of the final may consist to good advantage of some actual laboratory work.

Typewriting.

Some sets of questions contain a few very absurd questions so far as the particular subject is concerned. In most cases a greater part of the examination is devoted to testing for speed and accuracy in use of the machine. However, there are a few that test entirely for speed and accuracy. Probably the last type is more desirable.

Conclusions.

1. The final written examination in secondary schools puts more stress on rote and logical memory power than on any other mental power.
2. The examinations in foreign languages and most of the sciences give more emphasis to rote memory power than to any other mental trait, while those in English, history, geography and domestic science put the greatest stress on logical memory.
3. The written examinations do not give much attention to observation, emotional discrimination and originality. Probably it is necessary to supplement the written work at least in some high school subjects with other methods of testing.
4. The written examination may be made to test adequately rote memory power, logical memory power, and reasoning. Since the pupil must make careful preparation and organize his material in order to write an examination, it is evident that the written examination has an important place in the learning process. If properly administered the pupil's ability to use his knowledge is tested in a way that no other method can. It is evident, there-

fore, that every pupil should be subjected to the influence of this important educational device. For the benefit of the pupils, then, there should be no exemptions from finals.

5. There is too much emphasis on memory for facts. The examination questions should be so worded as to test the ability to make independent use of knowledge on the part of the pupils.

6. There should be supervision of questions, for many teachers, especially inexperienced ones, do not use good judgment in selecting questions. Often the questions are unimportant and vague. Occasionally the list of questions is too long.

VI. Appendix A

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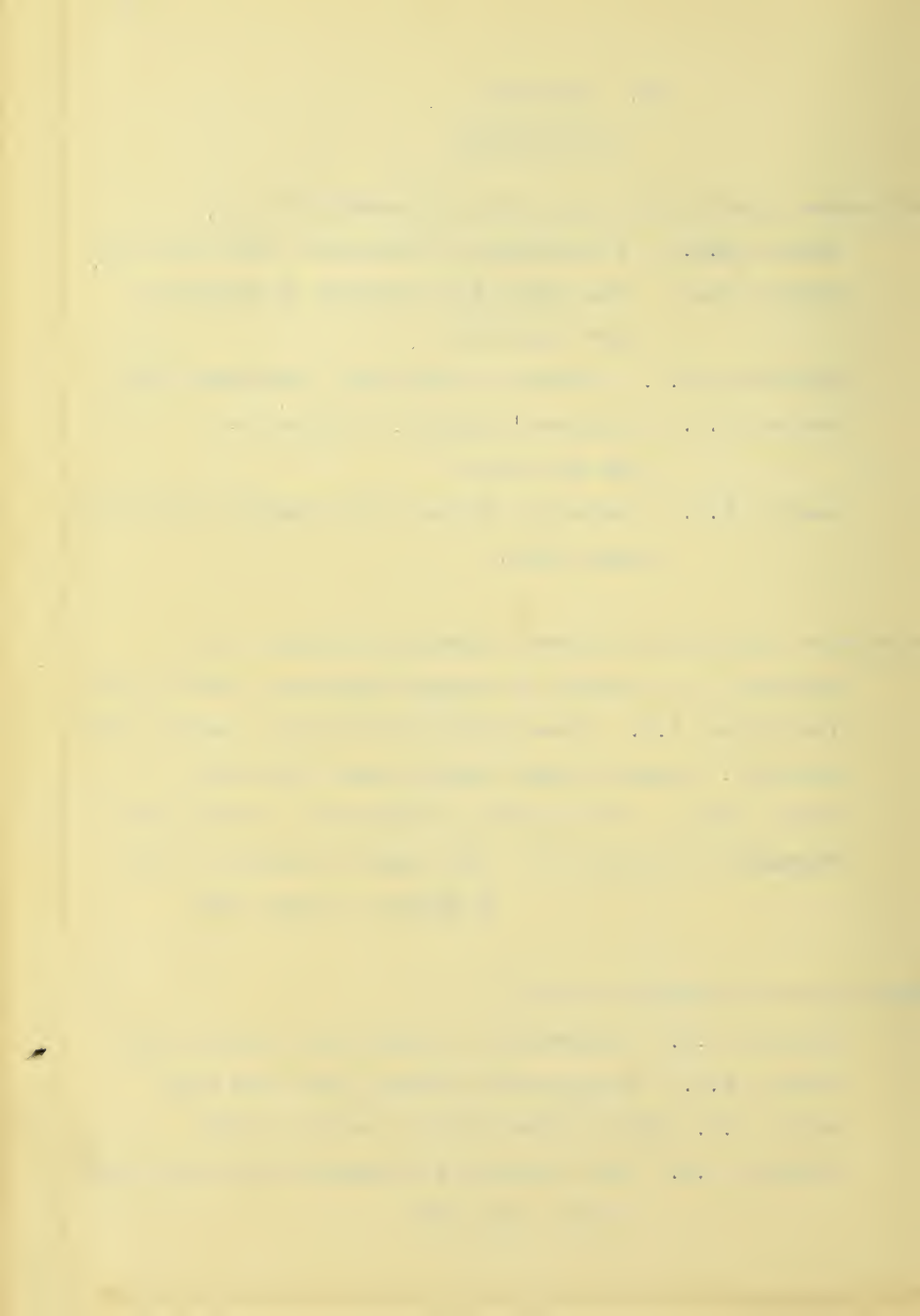
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